



# UNICUS OLYMPIADS

## Sample Paper

**Class 9**

**Unicus Mathematics Olympiad (UMO)**



Section	Total Questions	Marks per Questions	Total Marks
Classic Section	40	1	40
Scholar Section	10	2	20
<b>Grand Total</b>	<b>50</b>		<b>60</b>



## Unicus Mathematics Olympiad (UMO)

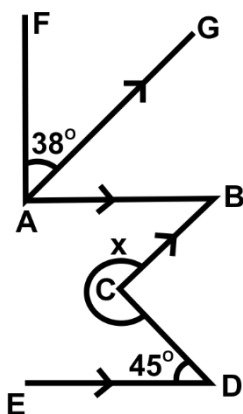
6. In the ground, soldiers are arranged in rows and columns. The number of soldiers in each column is twice the number of soldiers in each row. If the total number of soldiers is 16200, then find the number of soldiers in each row:

a. 45  
b. 90  
c. 180  
d. 360

7. Successive discounts of  $12\frac{1}{2}\%$  and  $7\frac{1}{2}\%$  are given on the marked price of a cupboard. If the customer pays \$2590, then what is the marked price?

a. \$3108  
b. \$3148  
c. \$3200  
d. \$3600

8. Given,  $AB \parallel ED$ ,  $AG \parallel CB$  and  $AF \perp AB$ .  $\angle FAG = 38^\circ$ ,  $\angle CDE = 45^\circ$ . Find the value of  $x$ :



a.  $263^\circ$   
b.  $277^\circ$   
c.  $289^\circ$   
d.  $308^\circ$

9. If  $\frac{3}{7} + x + (-\frac{8}{21}) + \frac{5}{22} = -\frac{125}{462}$ , then the value of  $x$  will be:

a.  $\frac{6}{11}$   
b.  $-\frac{5}{11}$   
c.  $-\frac{6}{11}$   
d.  $\frac{5}{11}$

10. To construct a kite which of the following is necessary?

a. Two adjacent unequal sides and included diagonal  
b. Two adjacent equal sides and included diagonal  
c. Opposite sides length  
d. None of these

11. If the sum of cubes of digits of a number is equal to the number itself, the number is called 'Armstrong Number'. Which of the following is the Armstrong Number?

a. 367  
b. 470  
c. 153  
d. 234

## Unicus Mathematics Olympiad (UMO)

12. The real factors of  $x^2 + 4$  are:

- |                         |                     |
|-------------------------|---------------------|
| a. $(x^2 + 2)(x^2 - 2)$ | b. $(x + 2)(x - 2)$ |
| c. $(x + 2)(x^2 - 2)$   | d. Does not exist   |
- 

13. Which of the following is true?

- a. The median of the data 10, 9, 13, 12, 5, 6, is 9.5
  - b. Range of data 13, 12, 14, 13, 15, 16, 18, 39, 41, 23, 27, is 27
  - c. The mean of the data 7, 8, 9, 11, 15, is 12
  - d. The mode of data is the highest value in data
- 

14. A tabletop, in the shape of a parallelogram, was polished, which cost \$20 per 10 cm<sup>2</sup>. If the base of the parallelogram is 45 cm and the total cost is \$2250, find the altitude of the parallelogram:

- |          |          |
|----------|----------|
| a. 15 cm | b. 25 cm |
| c. 20 cm | d. 24 cm |
- 

15. Find the value of  $a^2 + b^2 + c^2 - 2ab - 2ac + 2bc$  when  $a = 17$ ,  $b = 15$  and  $c = 13$ :

- |        |        |
|--------|--------|
| a. 111 | b. 121 |
| c. 225 | d. 361 |
- 

16. If  $x + y + z = 0$ , then the value of  $(x^2 + xy + y^2)$  is equal to:

- |                       |                       |
|-----------------------|-----------------------|
| a. $(y^2 + yz - z^2)$ | b. $(y^2 - yz + z^2)$ |
| c. $z^2 - zx + x^2$   | d. $z^2 + zx + x^2$   |
- 

17. Buses to city A arrive at the bus stop every 7 minutes while buses going to city B arrive at the bus stop every 5 minutes. If buses to both cities arrive at the bus stop together at 7:30 a.m., when will they arrive at the bus stop together?

- |              |              |
|--------------|--------------|
| a. 7:55 a.m. | b. 8:05 a.m. |
| c. 8:15 a.m. | d. 9:05 a.m. |
- 

18. A contractor undertook a contract to complete a part of a stadium in 9 months with a work force of 560 men. Later on it was required to complete the job in 7 months. Extra men employed by him is:

- |        |        |
|--------|--------|
| a. 160 | b. 150 |
| c. 100 | d. 120 |
-



**Unicus Mathematics Olympiad (UMO)**

27. Rationalise the denominator of  $(\sqrt{7} + \sqrt{5})/(\sqrt{7} - \sqrt{5})$ :

- a. 1
- b.  $6 + \sqrt{35}$
- c. 2
- d.  $6 - \sqrt{35}$

28. The reflex angle between the hands of a clock at 10:25 is:

- a.  $180^\circ$
- b.  $(192 \frac{1}{2})^\circ$
- c.  $195^\circ$
- d.  $(197 \frac{1}{2})^\circ$

29. The quantity of sugar used in the month of April is approximately what percent of the total quantity of food items used in the same month?

**Quantity of Various Food Items used by a Restaurant  
During the First Half of a Year (In kg)**

Food Items	Jan	Feb	March	April	May	June
Rice	250	230	210	260	240	220
Wheat	320	340	280	290	300	360
Sugar	240	210	200	210	160	150
Pulses	360	300	320	245	235	250
Vegetables	380	390	385	375	355	370
Misc.	460	485	440	460	475	480

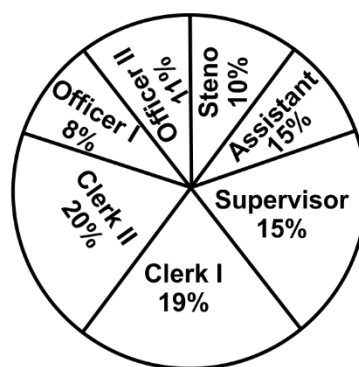
- a. 21%
- b. 18%
- c. 11%
- d. 25%

30. What is the difference in Direct Recruits and Promotee Assistants?

**OUT OF THESE**

	Direct	Promotee
1. Steno	30%	70%
2. Assistant	40%	60%
3. Supervisor	50%	50%
4. Clerk I	90%	10%
5. Clerk II	30%	70%
6. Officer I	90%	10%
7. Officer II	70%	30%

**Total Number of Employees = 7000**



- a. 210
- b. 280
- c. 180
- d. 110

31. Find the compound interest on \$31250 at 16% per annum compounded quarterly for 9 months:

- a. \$4000
- b. \$3902
- c. \$3500
- d. \$4200

32. A water tank is 30 m long, 20 m wide and 12 m deep. It is made up of an iron sheet which is 3 m wide. The tank is open at the top. If the cost of the iron sheet is \$10 per metre, then the total cost of the iron sheet required to build the tank is:

- |           |            |
|-----------|------------|
| a. \$6000 | b. \$8000  |
| c. \$9000 | d. \$10000 |
- 

33. A watch that gains uniformly is 2 minutes slow at noon on Monday and is 4 minutes 48 seconds fast at 2 p.m. on the following Monday. When was it correct?

- |                       |                        |
|-----------------------|------------------------|
| a. 2 p.m. on Tuesday  | b. 2 p.m. on Wednesday |
| c. 3 p.m. on Thursday | d. 1 p.m. on Friday    |
- 

34. A container has 60 L of milk. 20 L are drawn out of the container every day and replaced by 20 L of water. What will be the quantity of milk left in the container at the end of the third day?

- |            |         |
|------------|---------|
| a. 15 L    | b. 12 L |
| c. 17.77 L | d. 18 L |
- 

35. A 110 m long train is running at a speed of 60 km/h. How many seconds does it take to cross another train of length 170 m, which is standing on a parallel track?

- |         |         |
|---------|---------|
| a. 15.6 | b. 16.8 |
| c. 17.2 | d. 18   |
- 

36. The L.C.M. and H.C.F. of two numbers are 44 and 264 respectively. If the first number is divided by 2, the quotient is 44. What is the second number?

- |        |        |
|--------|--------|
| a. 44  | b. 88  |
| c. 132 | d. 176 |
- 

37. Three friends J, K and L jog around a circular stadium and complete one round in 12, 18 and 20 seconds respectively. In how many minutes will all three meet again at the starting point?

- |       |       |
|-------|-------|
| a. 18 | b. 9  |
| c. 3  | d. 21 |
- 

38. Alice gave 30% of his money to Olive. Olive gave  $\frac{2}{3}$  of what he received to his mother. Olive's mother gave  $\frac{5}{8}$  of the money she received from Olive to the grocer. She is left with \$600 now. How much money did Alice have initially?

- |            |           |
|------------|-----------|
| a. \$24000 | b. \$8000 |
| c. \$18000 | d. \$4000 |
-





## Unicus Mathematics Olympiad (UMO)

45. A rhombus OABC is drawn inside a circle whose centre is at O in such a way that the vertices A, B and C of the rhombus are on the circle. If the area of the rhombus, is  $32\sqrt{3} \text{ m}^2$ , then the radius of the circle is:

- |         |         |
|---------|---------|
| a. 64 m | b. 8 m  |
| c. 32 m | d. 46 m |
- 

46. Three persons, A, B and C invested \$3000, \$5000 and \$7000 to start a business. At the end of the year, the profit is \$100000, out of which 25% goes for charity. By how much is B's share greater than A's share?

- |            |            |
|------------|------------|
| a. \$20000 | b. \$10000 |
| c. \$5000  | d. \$2500  |
- 

47. The parallel sides of a field in the shape of a trapezium are 20 m and 41 m and the remaining two sides are 10 m and 17 m. Find the cost of levelling the field at the rate of \$30 per square m.

- |           |           |
|-----------|-----------|
| a. \$6400 | b. \$7320 |
| c. \$7500 | d. \$7000 |
- 

48. A student took five papers in an examination, where the full marks were the same for each paper. His marks in these papers were in the proportion of 6: 7: 8: 9: 10. In all papers together, the candidate obtained 60% of the total marks. then the number of papers in which he got more than 50% marks is:

- |      |      |
|------|------|
| a. 2 | b. 3 |
| c. 4 | d. 5 |
- 

49. The radius of a wire is decreased to one-third. If volume remains the same, length will increase by:

- |              |            |
|--------------|------------|
| a. 1.5 times | b. 3 times |
| c. 6 times   | d. 9 times |
- 

50. If  $a = 25$ ,  $b = 15$ ,  $c = -10$ , then find the value of the following:

$$\frac{[(a)^3 + (b)^3 + (c)^3 - 3abc]}{[(a - b)^2 + (b - c)^2 + (c - a)^2]}$$

- |        |       |
|--------|-------|
| a. 30  | b. -1 |
| c. -30 | d. 15 |
-

## Answer Key

1.	d	2.	d	3.	b	4.	d	5.	d	6.	b	7.	c
8.	a	9.	c	10.	a	11.	c	12.	d	13.	a	14.	b
15.	b	16.	d	17.	b	18.	a	19.	b	20.	d	21.	b
22.	c	23.	d	24.	d	25.	d	26.	c	27.	b	28.	d
29.	c	30.	a	31.	b	32.	a	33.	b	34.	c	35.	b
36.	c	37.	c	38.	b	39.	c	40.	a	41.	b	42.	d
43.	c	44.	c	45.	b	46.	b	47.	b	48.	c	49.	d
50.	d												